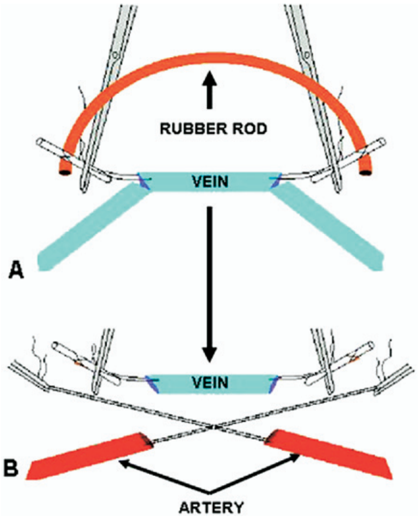


**Figure 1. Gottlob's method of "dissection without touching." A, The saphenous vein is kept under tension by "holding sutures" that are attached to a piece of bent rubber before isolation of the segment to be grafted. B, The severed ends of the vein remain under tension while the anastomosis is being sutured during insertion into the artery. (Modified from Gottlob R. The preservation of the venous endothelium by "dissection without touching" and by an atraumatic technique of vascular anastomosis. *Minerva Chir.* 1977;32:693-700.)**

graft is fixed by holding sutures to a bent rod of rubber" (Figure 1). Although the endothelium is protected by this method, other regions of the vein are damaged inasmuch as the instructions continue: "For dissection only the connective tissue surrounding the vessel was grasped by forceps and sharply severed away from the vein." We believe it important to stress that this technique is very different from Souza and associates'[3] "no-touch" technique of harvesting the human saphenous vein that has recently been shown to provide a long-term patency comparable with that of the internal thoracic artery. Here, the vein is removed with minimal damage, complete with its surrounding cushion of tissue. Importantly, there is no distension-induced endothelial damage to these veins because harvesting with surrounding tissue prevents spasm. Furthermore, this substantial perivascular cushion would be expected to protect the vein once implanted and exposed to arterial hemodynamics. Other important structures are preserved with Souza's technique. Until recently, the adventitia and its surrounding fat were regarded as merely providing mechanical support whereas their role as modulators of blood vessel structure and function are now recognized.[4] In addition, the vasa vasorum plays an important role in the maintenance of "healthy" blood vessels, and preservation of this microvascular network will restore the supply of oxygen and nutrients to the vein graft wall on removal of vascular clamps at completion of surgery.[5]

Gottlob's method of preparing the saphenous vein as a bypass graft is often cited, including its use in patients undergoing coronary artery bypass grafting.[6] The practicalities of doing so in an operating theater/sterile environment are intriguing. Although this technique may preserve the endothelium, the outer vessel regions are often damaged. Paradoxically, in an attempt to restore the blood supply to ischemic myocardium, the microvascular network of the vein is damaged and the graft wall rendered ischemic. Many studies into potential methods of reducing vein graft occlusion may be seen as attempts to repair the effects of surgical damage or examine ways of replacing, restoring, or inhibiting factors released by vascular trauma during harvesting. Such strategies range from adventitial delivery of drugs and gene transfer to pharmacologic interventions and methods of providing mechanical support.

In light of recent long-term results using Souza's "no-touch" technique, we believe that more precise details are required when describing surgical methods of vein harvesting. The difference between "dissection without touching" and "no-touch" may not be just in the wording, but in the graft's long-term performance.

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### *Reply to the Editor:*

In our pig model for studying vein graft thickening, we did not remove the adventitia[1] nor did we use the Gottlob method.[1] We agree, however, that the terminology relating to methods for harvesting saphenous veins for coronary artery bypass graft surgery has become misleading, both experimentally and clinically. Because it is impossible to employ a purely "no-touch" technique, the term "minimal touch" is more appropriate. Perhaps, "the Souza minimal-touch method" should be used in the future. Certainly, we fully accept the clinical data indicating that this latter method of harvesting saphenous veins improves vein graft patency.

Loesch and associates also stated that "preservation of this microvascular network will restore the supply of oxygen and nutrients." However, there are no empirical data to support this assertion. Furthermore, even though the vasa vasorum may be undamaged, it is still "disconnected" from the circulation by surgical removal, which may promote graft hypoxia.[2] Vein grafts also thicken adaptively and rapidly, increasing oxygen demand and ischemia even further.[2,3] We[4] recently found that oxygen tension in porcine vein grafts is markedly reduced for at least a month after implantation. Irrespective of the harvesting method, therefore, vein grafts would inevitably be rendered ischemic.

For the vasa vasorum to become functional again, microvascular repair (angiogenesis and reconnection to the circulation) would be mandatory.[2,3] In vein grafts fitted with external Dacron sheaths, oxygen tension is twice that in control grafts.[4] Since external sheaths promote the formation of a neo–vasa vasorum and inhibit graft thickening,[2] these data indicate that restoration of a functional vasa vasorum plays a role in mediating vein graft thickening. We[5] also found that despite removal of the adventitia in the pig isolated saphenous vein, a microvessel complex embedded in the medial/adventitial interface remains, from which robust angiogenesis occurs. Thus, even if the saphenous vein is stripped of its adventitia, the vein graft is capable of regenerating its own neo–vasa vasorum. We also suggested that risk factors, such as hyperhomocysteinemia, may impair this angiogenic repair, which in turn may contribute to vein graft failure associated with such risk factors. It is possible, too, that by retaining the vasa vasorum with the Souza method, reintegration of the vein graft microvasculature may be accelerated.

Retaining the adventitial/fat layer around the saphenous vein may elicit other beneficial effects, including a physical impact on intragraft hemodynamic forces or the release of substances that inhibit vascular smooth muscle cell replication. The adventitial/fat complex may also act as a "biosheath" that may elicit similar effects seen with synthetic sheaths in experimental animal models.[2] Interestingly, removal of the adventitia does not augment neointima formation or vein graft thickening in the pig (unpublished observations). However, there is barely any fat surrounding the saphenous vein in the pig, consolidating that it may be fat that is key to the positive effects underlying the Souza method.

Further studies are required to elucidate the mechanisms underlying the combined effect of adventitial and fat tissue surrounding saphenous veins on graft thickening.

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## Conservative management of postintubation tracheobronchial ruptures

### *To the Editor:*

We read with interest the article by Griffo and colleagues[1] regarding the conservative management of a postintubation tracheobronchial rupture (TBR), and we congratulate the authors for their results. This favorable outcome is not surprising and is in agreement with the evidence accumulated in recent literature.[2] Between June 1993 and July 2005, 30 patients presenting iatrogenic TBR, 16 secondary to intubations for elective surgery and 14 secondary to intubations for medical emergencies, were treated at our institution.[3] The mean TBR length was 4.5 ± 1.5 cm (range, 1–7.5 cm). Fifteen patients, not requiring mechanical ventilation, underwent simple conservative management. In 3 cases, transient noninvasive ventilatory support was used to treat a mild respiratory distress correlated to a frank anterior intraluminal protrusion of the esophagus trough full-thickness rupture. All of these lesions healed without sequelae. Thirteen patients on mechanical ventilation were considered at high surgical risk. To ensure ventilation, tracheal tears were bridged as salvage therapy. In 5 patients, TBR bridging was attempted by simply advancing the endotracheal tube distal to the injury; in 6 other patients, presenting a TBR too close to the carina, TBR bridging was attempted by separating bilateral mainstem endobronchial intubation. Two cases of aseptic mediastinal collection were found by follow-up chest computed tomography and were drained by simple cervical approach. Nine of 13 ventilated patients (69%) who were treated conservatively completely recovered. Two patients on mechanical ventilation, in whom the bridging was technically not feasible, underwent surgical repair and died. Our results confirm the effectiveness of conservative management in iatrogenic TBR. In patients not requiring mechanical ventilation, conservative management includes noninvasive ventilatory support. The outcome was independent of the tracheobronchial length[2,3]; pneumothorax, extensive subcutaneous emphysema, and mediastinal collections were drained as needed. So, we disagree with the author's conclusions: "Treatment can be conservative or aggressive depending on the extension of the lesion. . . . Usually, conservative treatment is preferred for stable patients with small uncomplicated tracheobronchial lesions. . . . Surgical treatment (through a standard thoracotomy or transcervical approach) is reserved for patients requiring mechanical ventilatory support. . . ." Surgery in critically patients involves a high risk, with a reported mortality as high as 71.4%.[4] Such a high mortality for the repair of TBR in critically ill patients receiving mechanical ventilation demands that alternatives to high-risk surgery be considered.

We recommend conservative nonoperative therapy as the best approach to postintubation TBR (1) in patients who are on spontaneous ventilation, (2) when extubation is scheduled within 24 hours from the time of diagnosis, or (3) for patients who will require continued ventilation to treat their underlying respiratory status. Surgical repair should be reserved for patients in whom bridging the lesion is technically not feasible or for patients with injuries diagnosed during thoracic surgery.